

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

PCT

To:

see form PCT/ISA/220

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY
(PCT Rule 43bis.1)

Date of mailing
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference
see form PCT/ISA/220

FOR FURTHER ACTION
See paragraph 2 below

International application No.
PCT/EP2004/052532

International filing date (day/month/year)
14.10.2004

Priority date (day/month/year)
27.10.2003

International Patent Classification (IPC) or both national classification and IPC
C07C49/84, C07C45/46, C07C45/64, C07C45/81, C08F2/50

Applicant
LAMBERTI SPA

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA"). However, this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of three months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

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**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**International application No.
PCT/EP2004/052532

1AP20 Rec'd PCT/PTO 26 APR 2006

Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
 - ☐ This opinion has been established on the basis of a translation from the original language into the following language , which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
 - a. type of material:
 - ☐ a sequence listing
 - ☐ table(s) related to the sequence listing
 - b. format of material:
 - ☐ in written format
 - ☐ in computer readable form
 - c. time of filing/furnishing:
 - ☐ contained in the international application as filed.
 - ☐ filed together with the international application in computer readable form.
 - ☐ furnished subsequently to this Authority for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/EP2004/052532

Box No. V Reasoned statement under Rule 43b/s.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	1-11
	No: Claims	
Inventive step (IS)	Yes: Claims	1-11
	No: Claims	
Industrial applicability (IA)	Yes: Claims	1-11
	No: Claims	

2. Citations and explanations

see separate sheet

Re Item V

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Documents

Reference is made to the following documents:

D1: EP-A-0 003 002 (CIBA GEIGY AG) (1979-07-11)

D2: US-A-3 340 233 (LEAVITT FREDERICK C) (1967-09-05)

2. Subject matter

Claims 1-7 define a process for the preparation of 2-hydroxy-1-(4-(4-(2-hydroxy-2-methyl-propionyl)-phenoxy)-phenyl)-2-methyl-propan-1-one via a Friedel Crafts reaction of diphenylether with an alpha-bromoisobutiryl bromide or alpha-chloroisobutiryl chloride, followed by hydration of the halide, and finally a crystallization step. The 2-hydroxy-1-(4-(4-(2-hydroxy-2-methyl-propionyl)-phenoxy)-phenyl)-2-methyl-propan-1-one is also claimed as a white powder in claim 8 and the use of the white powder as a photoinitiator in photopolymerizable systems in claims 9-11.

3. Novelty

The document D1 discloses (see abstract, tabel 1, compound 21 and pages 28-29) 2-hydroxy-1-(4-(4-(2-hydroxy-2-methyl-propionyl)-phenoxy)-phenyl)-2-methyl-propan-1-one as a wax, to be used as photoinitiator in photopolymerizable systems. The preparation is also disclosed and includes a bromination, the formation of an intermediate epoxide and the hydrolysis of the epoxide to give the desired compound. The subject-matter of D1 differs from the subject-matter of the preparation claims 1-7 in that a different process is used. Moreover, the final product is a white solid in the application, whereas a wax is obtained in D1. Therefore, the subject matter of independent claims 1,8,9 and 11 is novel over D1 (Article 33(2) PCT).

The document D2 discloses (see examples 1 and 6) the Friedel Crafts reaction of diphenylether with beta-chloropropionyl chloride. The subject-matter of D2 differs from the subject-matter of the preparation claim 1 in that only the first reaction (Friedel Crafts reaction) is disclosed. No 2-hydroxy-1-(4-(4-(2-hydroxy-2-methyl-propionyl)-phenoxy)-phenyl)-2-methyl-propan-1-one is prepared. Therefore, the subject matter of independent claims 1,8,9 and 11 is novel over D2 (Article 33(2)

PCT).

4. Inventive step

The document D1 is regarded as being the closest prior art to the subject-matter of independent claim 1,8,9 and 11 and shows (see abstract, tabel 1, compound 21 and pages 28-29) the preparation of 2-hydroxy-1-(4-(4-(2-hydroxy-2-methyl-propionyl)-phenoxy)-phenyl)-2-methyl-propan-1-one as a wax, to be used as photoinitiator in photopolymerizable systems. From this, the subject-matter of the independent claims 1 differs in that 2-hydroxy-1-(4-(4-(2-hydroxy-2-methyl-propionyl)-phenoxy)-phenyl)-2-methyl-propan-1-one is obtained as a solid product via a different sequence of reaction steps, including a crystallization step. The subject-matter of the independent claims 8,9 and 11 differs from D1 in that no solid product is used as a photoinitiator in photopolymerizable systems.

The problem to be solved by the present invention may be regarded as the preparation of a solid 2-hydroxy-1-(4-(4-(2-hydroxy-2-methyl-propionyl)-phenoxy)-phenyl)-2-methyl-propan-1-one and the use of this compound, in an different physical form, as a photoinitiator.

The solution to this problem proposed in claim 1,8,9 and 11 of the present application is considered as involving an inventive step (Article 33(3) PCT) for the following reasons:

Document D1, or any other document in the prior art, does not suggest the preparation of solid 2-hydroxy-1-(4-(4-(2-hydroxy-2-methyl-propionyl)-phenoxy)-phenyl)-2-methyl-propan-1-one via a Friedel Crafts, hydration and crystallization step, nor is the use of this solid as a photoinitiator suggested. Thus, given the teaching of the prior art, the skilled person would not consider solving the problem in the same way as the present application. Therefore, the solution proposed in independent claims 1,8,9 and 11 of the present application can be considered as involving an inventive step (Article 33(3) PCT).

Claims 2-7 and 10 are dependent on claims 1 and 9 respectively and as such also meet the requirements of the PCT with respect to novelty and inventive step.